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Wetlands Protection Programs

Cypress swamp on Big Cypress Creek near Caddo Lake

Wetlands Protection Programs

Wetlands are waters in the state and as such are protected from degradation by the TSWQS. The TSWQS general policy, general criteria, and the antidegradation policy are particularly relevant to wetlands protection.

Current Status of Major Wetland Types

Wetlands comprise less than five percent of the state's total area, and Texas is one of 19 states that have exhibited some of the most significant losses of wetland ecosystems. The major wetland ecosystems of Texas include coastal marshes and estuaries, forested scrub/shrub, tidal flats, swamps, bottomland hardwoods, and the playa lakes, which are concentrated in the Panhandle. Wetlands are significant natural resources providing important functions, including: nutrient and toxicant removal, transformation, and retention; sediment retention; groundwater recharge; shoreline stabilization and protection; floodwater storage and flood attenuation; and food chain production and habitat for wetland-dependent species.

In 1974, TPWD initiated a statewide habitat mapping effort that analyzed and classified Landsat data. This produced vegetation cover maps and detailed quantitative inventory information for each of the mapped cover types. These types included coastal marshes, swamps, bottomland hardwoods, and other forested wetlands (Figure 24) (NOAA, 1991; Diener, 1975; Guthery and Bryant, 1982; and Frye, 1987).

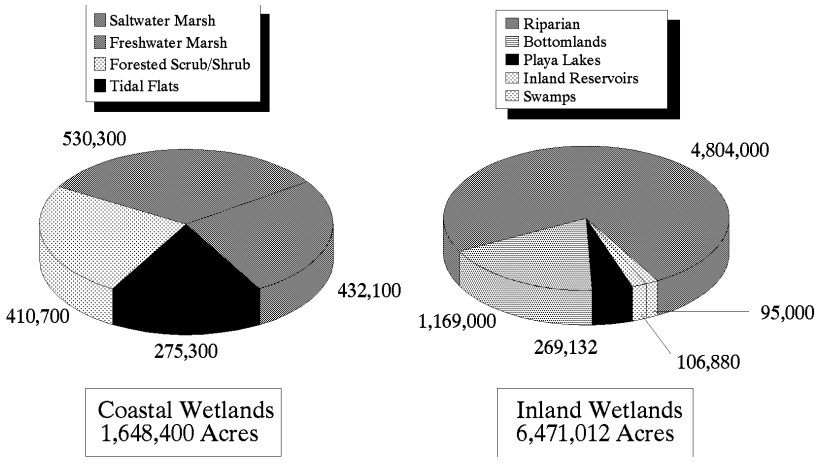

Figure 24. Coverage of Texas Coastal and Inland Wetlands in Acres

Coastal Wetlands

In 1956, the USFWS estimated that Texas coastal marshes totaled 937,400 acres. In the absence of earlier estimates, this figure serves as a baseline, although by 1956 Texas had sustained losses of coastal wetlands due to the dredging of the Gulf Intracoastal Waterway, other ship channels, agricultural drainage, and industrialization and urbanization.

The 1991 NOAA Report estimates that Texas Coastal wetlands totaled 1,648,400 acres (NOAA, 1991). Coastal wetlands include salt and fresh marshes, forested scrub/shrub, and tidal flats. Of this total, 962,400 acres are classified as coastal marshes. Results of the TPWD mapping effort estimates based on the National Wetlands Inventory show that there were 611,760 acres of coastal marshes in the mid 1970s. The USFWS estimated that there were 451,500 acres of coastal marshes in 1979; however, this estimate is probably low, since not all of the quadrangles used in the National Wetlands Inventory had been digitized at that time so the information was not complete. Moulton et al (1997) estimated that in 1992 there was a total of 3,894,753 acres of wetlands in the approximately 20,000 square mile area they defined as the coastal zone. Their study represents an estimated net loss of 210,590 acres between 1955 and 1992. White et al (1993) showed a net loss of 33,400 acres (19 percent) in the Galveston Bay system between 1953 and 1989. The rate of loss declined over time from about 1,000 acres per year between 1953 and 1979 to about 700 acres per year between 1979 and 1989.

Playa Lakes of the Panhandle Region

There are about 20,000 playa lakes located in about 37 counties of the Texas Panhandle. The total area in playa basins has been estimated at 296,000 acres. This region, comprised of the High and Rolling Plains, is an important wintering area for large numbers of ducks, geese, sandhill crane and other nongame wading birds. The playa lakes, man-made reservoirs, and stock ponds, surrounded by vast acreage of winter wheat, corn, and other grain crops, are an important wintering habitat for waterfowl. This is especially evident in wet years, when many of the estimated 20,000 playas contain water. During these times, more than a million waterfowl forage in the farm and ranch lands of the Panhandle. The area historically has wintered a large portion of the shortgrass prairie Canada goose population. Hundreds of thousands of waterfowl terminate their southward migration in this checkerboard of water and bountiful grainfields. Other wildlife species in the Panhandle rely heavily on the habitat associated with the playa basins in a region of limited habitat.

These plains, which are among the most intensively cultivated regions of the United States, are in a period of change. Ample water for irrigation

from the Ogallala Formation produced this extensive farmland. Thousands of agricultural and municipal wells depend upon the Ogallala for their water supply, and it is unlikely this demand can continue to be met indefinitely.

Significant increases in costs of pumping water from the declining Ogallala already have resulted in efforts to use the surface waters of the playas more efficiently. Many have been modified into steep-sided pits to produce favorable conditions that reduce evaporation, and to increase pumping efficiency for recycling irrigation runoff waters. About 33 percent of all playa lakes have been modified, including about 69 percent of all playas 10 acres or larger. Modification can provide benefits to wildlife, but it also has drawbacks. The future of the playa lakes is uncertain because of changing agricultural land use practices and the unknown future of the Ogallala Formation.

Forested Wetlands

The significance of assessing the status of bottomland hardwoods and other forested wetlands in Texas cannot be overstated, considering present and future land use trends. Proposed reservoir development, timber clearing, and attendant land use changes promise further loss and modification to these important wetland ecosystems. Forested wetlands, which include bottomland hardwoods, have been defined as areas that have woody vegetation that is 20 feet tall or taller and are flooded or have a water-saturated soil on at least a temporary or intermittent basis. Vegetation cover types mapped and inventoried by the TPWD study generally conform to this definition. Delineated bottomland hardwood plant communities included Zones I through V of the six-zone concept developed by the National Wetlands Technical Council and further described by the USFWS. Although data from a wide range of Landsat overflights between 1972 and 1980 were used, a baseline inventory year of 1980 was established to simplify documentation. Classification accuracy in discriminating bottomland hardwoods from similar riparian vegetation generally was quite high, with error rates usually below 10%.

Inventoried acreage of forested wetlands in 1980 was approximable 6,079,880 acres, including 5,973,000 acres of bottomland hardwood and other forested riparian vegetation and 95,000 acres of swamps. Geographical distribution of this acreage is given in Table 70. Cover types representing bottomland hardwoods and other forested wetlands derived from the Landsat mapping project were ultimately categorized according to five principal vegetation groups. They include: 1) cottonwood-hackberry-salt cedar brush/woods; 2) pecan-elm forest; 3) water oak-elm-hackberry forest; 4) willow oak-water oak-black gum forest; and 5) bald cypress-water tupelo swamp.

As indicated by Table 70, most bottomland hardwoods occur in East Texas. While 1.2 million acres are confined to six major river courses, an additional 3 million acres are represented within the tributaries of these rivers, yielding a total hardwood acreage of approximately 4,231,000 acres. Remaining riparian forests in Texas account for an estimated 1.8 million acres.

Trends

The amount of bottomland hardwood and other forested wetlands occurring prior to the settlement of Texas is estimated to have been 16 million acres. This estimate is based on acreage of geologic floodplains in Texas and assumes that all or most of these floodplains were originally forested. The remaining bottomland vegetation (excluding swamps) inventoried by Landsat comprised 5,973,000 acres in 1980, indicating a 63 percent loss of the original bottomland component. This remaining bottomland acreage constitutes only 3 percent of the total land area of the state and comprises just 7 percent of all occurring woody vegetation.

Table 70. Geographical Distribution of Bottomland Hardwood and Riparian Vegetation in Texas in 1980 (Frye, 1987)

Location	Amount (Est. Acres)
Trinity River	305,000
Neches River	257,000
Sabine River	255,000
Sulphur River	175,000
Cypress Bayou	89,000
Angelina River	88,000
River tributaries, riparian drainages east of the Navasota River	3,062,000
Remaining rivers, creeks, and riparian drainages	1,742,000
Total[1]	**5,973,000**

[1] Excludes swamps, which total 95,000 acres (1980)

A land use change detection study contracted by the Texas A&M University Remote Sensing Center was completed for the TPWD in 1986. The study measured changes in land use over 11 regions of Texas. Portions of

river basins associated with the Sulphur, Sabine, Trinity, Colorado, and Neches River systems were included in the study. Within the vicinity of the Middle Sulphur River, combined upland and bottomland hardwood vegetation decreased by 9 percent over a period of eight years between 1973 and 1981. The upper Sabine River basin exhibited a combined loss of 3 percent during the same period among upland and bottomland cover types. Portions of the middle Trinity and upper Neches Rivers actually exhibited an overall increase of combined bottomland and upland vegetation of greater than 19 percent between 1973 and 1981, while the Lower Colorado River region near Columbus exhibited an overall 12 percent decline between 1972 and 1981.

The change detection study also indicated that clear cutting of forests resulting from ongoing commercial timber industry practices increased by as much as 64 percent during the period between 1974 and 1983.

The USFWS has reported that available data on trends contained within the U.S. Forest Service's forest statistics reports indicate that commercial bottomlands have decreased by 18 percent between 1935 and 1975, with a further 10% decrease occurring during the period 1975-1985.

Future declines in bottomland hardwoods are expected from continued land use changes. The Texas Water Plan has identified 14 sites for reservoir construction to satisfy projected water needs through the year 2030. While these reservoirs will create additional fisheries habitat and increase the amount of lacustrine wetlands, significant adverse impacts will occur to existing palustrine wetlands. A total of 33,186 acres, 1 percent of the remaining 5,973,000 acres of bottomland hardwoods, will be lost statewide to these 14 proposed reservoirs, should they all be constructed (Table 67). Over 1.5 million acres of natural vegetation, including over 600,000 acres of bottomland hardwoods, are estimated to have been lost from reservoirs already constructed.

These projected losses are based on the direct impacts of reservoir development. This includes the immediate loss and modification of vegetation communities from the construction of the dam and spillway, impoundment of water, and subsequent fluctuation of the reservoir pool level.

Additional losses from indirect impacts will occur. Crop production, stimulated residential and commercial development, increased market potential of timber below dams, and long-term biological modification of downstream riparian ecosystems are all influencing factors that may produce more loss and/or modifications to the riparian communities than result from direct impacts.

Regardless of reservoir development, losses are expected to occur to riverine systems from ongoing timber harvest operations, which are being driven by a demand for hardwood products and by timber owners who are taking advantage of the opportunity to market timber within floodplain areas

The continued decline of high quality bottomland hardwood forests and associated wildlife has prompted preservation efforts by state, federal, and private entities. A program to preserve bottomland hardwood habitat and associated wildlife resources in Texas has been initiated by the USFWS. The USFWS has documented this program in detail, including its goals and objectives, descriptions of biological resources, and the identification of 62 candidate preservation sites.

Wetland Systems Significant to Threatened and Endangered Species in Texas

The state of Texas encompasses a wide variety of habitat types. Sensitive wetland systems can be found in every region of the state; many provide crucial habitat for the 88 species listed as candidate, threatened, or endangered species. Texas wetlands that support threatened and endangered animals and plants fall into three general categories: riparian systems of major river drainages; freshwater springs and associated cave formations; and coastal marshes.

Riparian systems and the associated woodland areas are the most widespread wetland type, being found from the High Plains of the Panhandle to the South Texas Brushlands to the Piney Woods of East Texas. Most of the rivers in the state have been dammed or altered in some manner, often eliminating important habitat for sensitive species

Freshwater springs and the subterranean cave formation often associated with those systems are found throughout the limestone formations of the Edwards Plateau in Central Texas and above the aquifer formations of the trans-Pecos region. These unique systems, which are highly vulnerable to water pollution and overuse of the waters, are habitat for significant numbers of unusual plants and animals.

The Texas coast covers more than 624 miles. Its estuaries, bayside marshes, seashore, and islands are important wintering, feeding, and breeding grounds for many unique species. The whooping crane is among the best known of the species that utilize the Texas coast, but others, such as the reddish egret and the brown pelican, also depend on these valuable wetlands.

Wetland Monitoring Program

The TNRCC does not have an independent wetland monitoring program; however, some wetland monitoring is done in conjunction with the SWQM Team. This includes monitoring stations located in shallow bays and estuaries and in the backwaters of lakes that have wetland characteristics. Wetland sites are also included in some special studies. If in the future, personnel and funds are available, additional monitoring of wetlands could be expanded to include all types of Texas wetlands.

Table 71. Projected Statewide Bottomland Hardwood Loss through Direct Affects from 14 Reservoirs Listed in the Texas Water Plan

Reservoir	Bottomland Hardwood and Riparian Forest (acres)
Applewhite	908
Bosque	793
Lindenau	2,388
Little Cypress	7,359
Paluxy	566
Allen's Creek	no information
Cuero	5,805
Eastex	3,517
New Bonham	no information
Post	0
Goliad	2,541
Site A Channel Dam	422
Tehuacana	6,993
Big Sandy	1,894
Grand Total	33,186

Biological Characterization of Wetlands on a Regional Basis

Texas is ecologically diverse. Climatic conditions, topography, and strong edaphic gradients have divided plant and animal life in Texas into seven distinct biotic provinces (Blair, 1950). Among the biotic provinces, wetlands

vary in frequency and position within the landscape as well as in community composition. Differences in wetland topology and community composition suggest that wetlands in Texas may be functionally diverse.

Wetland Protection Activities

In 1989, the Texas Legislature established a single statewide definition for wetlands:

> Wetlands means an area (including a swamp, marsh, bog, prairie pothole, or similar area) having a predominance of hydric soils that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and that under normal circumstances supports the growth and regeneration of hydrophytic vegetation.

The term "hydric soil" means soil that, in its undrained condition, is saturated, flooded, or ponded long enough during a growing season to develop an anaerobic condition that supports the growth and regeneration of hydrophytic vegetation.

The term "hydrophytic vegetation" means a plant growing in water or a substrate that is at least periodically deficient in oxygen during a growing season as a result of excessive water content.

The term "wetlands" does not include:

a. irrigated acreage used as farmland;

b. man-made wetlands of less than one acre; or

c. man-made wetlands not constructed with wetland creation as a stated objective including but not limited to impoundments made for the purpose of soil and water conservation which have been approved or requested by soil and water conservation districts. (This section only applies to wetlands constructed or created after August 28, 1989.)

One of the TNRCC's goals is to assure that there is "no net loss" of the functions of the state's existing wetlands. This is implemented primarily by a tiered system of review of Federal permits for compatibility with state requirements. The state has not been delegated the U.S. Army Corps of Engineers Section 404 permit authority and is not considering assumption of the program at this time; however, all 404 permits are subject to a Section 401 certification review from the TNRCC. Section 401 of the Clean Water Act recognizes the primary responsibility of the state for establishing and maintaining standards for the quality of the state's water by ensuring federal

discharge permits are consistent with the TSWQS. If the state denies water quality certification, the federal permit cannot be issued. The TNRCC is responsible for certifying most federal permits other than federal permits related to oil and gas production, which are certified by the Railroad Commission of Texas.

The TNRCC rules governing water quality certifications are found in 30 TAC Chapter 279. The responsibility for all certification functions is delegated to the executive director; however, at the request of a commissioner or the executive director, the commission may review the question of certification before the executive director reaches a decision. In June of 1995, the TNRCC revised Chapter 279. Substantive revisions included the following: incorporation of the commission's policy of no overall net loss of wetland resources with respect to wetland functions; inclusion of River and Harbor Act Section 10 permits as Corps of Engineers permits requiring certification; option for the executive director to delay certification until after a review of the draft permit or the statement of findings; clarification of nonadjudicative public hearing requirements; incorporation of the mitigation sequencing requirements of the federal 404(b)(1) guidelines as certification criteria for 404 permits; changing nationwide and general permit certification requirements to be applicable for any nationwide or general federal license or permit; and certification procedures for federal permits or licenses for agencies other than the EPA or the Corps of Engineers.

The TNRCC's Section 401 water quality review and certification process can be an effective tool for protecting wetlands from being filled; however, it only protects against wetland loss due to activities that require Corps of Engineers 404 permits.

The state does not make jurisdictional wetland evaluations. The TNRCC does participate in some field investigations of wetlands related to Water Quality Certification actions. Staff conducting individual certification reviews also make site visits to aid in their evaluations of impacts to water quality.

One mechanism of protecting a pristine or sensitive wetland is to designate it as an "Outstanding National Resource Water" (ONRW), conduct a public hearing on the WQS and apply this designation to the water body in question. Implementation of this designation at both the state and federal level is then effective upon approval by the EPA. Specific designation in the TSWQS as an ONRW ensures that state and federal activities (particularly NPDES permitting) are controlled to "maintain and protect" the water quality. Currently there are no ONRWs in Texas.

The Texas Review and Comment System (TRACS) coordinated by the Governor's Office allows all state resource agencies the opportunity to review and comment on all projects that use federal funds and might have an impact

on wetlands within the state. This is an effective way for each resource agency to use its respective responsibility to protect the state's wetlands.

Education is the key to protection and enhancement of our remaining wetlands. There is a strong need for technical training and education for a broad range of groups to support implementation of the no net loss goal. State and federal agency personnel, local governments, consultants, and private landowners need to be informed with regard to standards and techniques for implementing the no net loss goal, procedures for evaluating the functions of wetlands, methods for wetland delineation, and methods for restoring and creating wetlands (including evaluation of project success).